PATENT SPECIFICATION (11) 1 470 928

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(21) Application No 36321/75 (22) Filed 3 Sept. 1975 (19)

(44) Complete Specification published 21 April 1977

(51) INT. CL.[2] A41C 3/14

Index at acceptance
A3V 5E2

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(54) ARTICLES OF CLOTHING

(71) We, H. K. BONDING FABRIC CO. LTD., a Company organised under the laws of the Colony of Hong Kong, of 801, Regent House, Central, Hong Kong, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to seamless brassière cups for foundation garments and a method of manufacturing the same.

In conventional bra manufacture, the shape of a bra cup is produced by means of one or more seams across the cup. Such seamed bra cups have the disadvantage that, if the seam is on the inside the cup, it may cause uncomfortable rubbing against the skin, and if on the outside of the cup, it may be susceptible to frictional damage due at least in part to friction between an outer garment and the bra cup.

More recently bra manufacturers have sought to produce bras with seamless cups but a major difficulty has been to produce seamless cups having sufficient strength to provide adequate support for the wearer.

It has been proposed to manufacture seamless cups for bras of the padded type by thermally moulding into the appropriate shape a composite fabric comprising a non-woven fibrous filling layer having woven or knitted fabric layers bonded to either side thereof. However it is generally observed that after the thermal moulding step the outer woven or knitted layers do not lie smoothly on the filling layer but tend to crease causing discomfort to the wearer.

According to the present invention there is now provided a seamless brassière cup which comprises two thermally moulded separable superimposed layers of the same or different composite fabrics said composite fabrics each comprising a non-woven fibrous filling layer bonded to a woven or knitted layer, and the non-woven fibrous filling layers of the fabrics being in contact with each other.

Both the non-woven fibrous filling layer and the woven or knitted layer of the composite fabrics must be mouldable at elevated temperature without creasing and must retain their moulded shape after moulding. Fabrics made from thermosetting synthetic fibres, for example polyester and polyamide (nylon) fibres, are thus generally suitable and we have found that for most purposes composite fabrics comprising a polyester fibre non-woven layer and a knitted polyamide (nylon) layer are particularly appropriate.

In order to combine the best wear characteristic and the greatest comfort and most effective support for the wearer it is generally appropriate for the woven or knitted layer of the composite fabric on the outside of the cup to be thicker than the woven or knitted layer of the composite fabric on the inside of the cup and in addition for the non-woven layer of the composite fabric on the outside of the cup to be denser and thinner than the non-woven layer of the composite fabric on the inside of the cup.

According to a further feature of the present invention, there is provided a method of manufacturing a seamless brassière cup which comprises thermally moulding two separable superimposed layers of the same or different composite fabrics, said composite fabrics each comprising a non-woven fibrous filling layers bonded to a woven or knitted layer with the non-woven layers facing each other, whereby cups of the desired shape are formed.

In one method according to the invention, the two composite fabrics are placed one on the other with their non-woven layers facing each other. The superimposed fabrics are placed over one mould section and the second mould section is then placed in position with the superimposed composite fabric layers therebetween. It is in general desirable to peg or otherwise fix the edges of the fabrics whereby sliding of the fabrics is prevented upon positioning of the second mould section.

The moulding is preferably effected in two or more stages, the two composite fabric layers being held together, for example with pins, to prevent relative movement therebetween in at least the first stage.

At least one section of the mould is generally preheated prior to contact with the composite fabric layers. For composite fabrics comprising a non-woven layer of polyester fibres and a knitted polyamide (nylon) layer, the mould section is conveniently pre-heated to about 130°C. The moulding stage or stages generally last for 10 seconds or longer. The positioning of the second mould section and the application of heat results in stretching and thermal setting whereby the fabrics are thermally moulded to the desired shape.

After the moulding of the cup shape has been completed side flanges around the cup are cut off either by hand with scissors or by other mechanical means. The bra cup may then be used in the manufacture of a bra or corset.

An embodiment of the invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a plan view of a bra cup with side flanges formed during moulding removed; and

Figure 2 is a sectional view of the same bra cup cut across the plane X—X in Figure 1.

The bra cup illustrated comprises two separate layers of two different composite fabrics A and B. Fabric A on the outside of the cup C comprises a thick knitted nylon layer 1 and a compact polyester fibre non-woven layer 2 adhesive bonded thereto. Fabric B on the inside of the cup D comprises a knitted nylon layer 3 which is thinner than layer 1 and a polyester fibre non-woven layer 4 adhesive bonded to layer 3, layer 4 being bulkier and less compact than layer 2. The shape of the bra cup in two dimensions is shown in Figure 1. The shape in the third dimension across the plane X—X is indicated in Figure 2, the shape across the plane Y—Y in Figure 1 being generally similar to that across the plane X—X.

The bra cup shown in the drawing may be conveniently manufactured as follows. One flat piece of composite fabric B is placed on top of a flat piece of composite fabric A with the non-woven polyester fabric layers 4 and 2 facing each other. The superimposed layers are placed over a concave cup-shaped mould section and the two fabric layers are secured together by means of pegs. The second convex mould section preheated to 130°C is then inserted into the first-mentioned cup-shaped mould section with two fabric layers therebetween for 10 seconds. The knitted nylon layers stretch under the heat and pressure of the mould and the polyester fibre non-woven layers mould together. The mould is then opened, the pegs are removed and the second mould section, again preheated to 130°C, is replaced for a further 10 seconds and is thereafter finally removed. On removal from the mould the two fabric layers have taken a bra cup shape. Side flanges around the cup are cut off with scissors.

WHAT WE CLAIM IS:—

1. A seamless brassière cup which comprises two thermally moulded separable superimposed layers of the same or different composite fabrics said composite fabrics each comprising a non-woven fibrous filling layer bonded to a woven or knitted layer, and the non-woyen fibrous filling layers of the fabrics being in contact with each other.

2. A brassière cup as claimed in claim 1 wherein the non-woven layer and/or the woven or knitted layer of each of the composite fabrics is/are made of thermosetting synthetic fibres.

3. A brassière cup as claimed in claim 1 or claim 2 wherein the woven or knitted layer of each of the composite fabrics is knitted polyamide (nylon).

4. A brassière cup as claimed in any of claims 1—3 wherein the non-woven layer of each of the composite fabrics is a polyester fibrous web.

5. A brassière cup as claimed in any of the preceding claims wherein the woven or knitted layer of the composite fabric on the outside of the cup is thicker than the woven or knitted layer of the composite fabric on the inside of the cup.

6. A brassière cup as claimed in any of the preceding claims wherein the non-woven layer of the composite fabric on the outside of the cup is denser than the non-woven layer of the composite fabric on the inside of the cup.

7. A brassière cup as claimed in any of the preceding claims wherein the non-woven layer of the composite fabric layer on the outside of the cup is thinner than that of the composite fabric layer on the inside of the cup.

8. A seamless brassière cup substantially as herein described with reference to and as illustrated in the accompanying drawings.

9. A method of manufacturing a seamless brassière cup which comprises thermally moulding two separable superimposed layers of the same or different composite fabrics, said composite fabrics each comprising a non-woven fibrous filling layer bonded to a woven or knitted layer with the non-woven layers facing each other, whereby cups of the desired shape are formed.

10. A method as claimed in claim 9 wherein the moulding is effected in a pre-heated mould.

11. A method as claimed in claim 9 or claim 10 wherein the composite fabric layers are composed of polyester and/or polyamide (nylon) and the mould is preheated to 130°C.

12. A method as claimed in claim 11 wherein the moulding is effected in one or more stages, each stage lasting for a period of at least 10 seconds.

13. A method as claimed in any of claims 9 to 12 wherein after moulding, side flanges formed around the cup are cut off.

14. A method of manufacturing seamless brassière cups substantially as herein described.

15. Seamless brassière cups when manufactured by a method as claimed in any of claims 9 to 14.

16. A brassière having seamless cups as claimed in any of claims 1 to 8 and 15.

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Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1977.
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY,
from which copies may be obtained.